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ABSTRACT

Many different techniques have been used to increase response rates to surveys. In this study, Federal Express overnight service was used to test the effectiveness of express mail in stimulating response to a mail survey of 132 physicians. The sample was randomly split into two groups. One group received the initial mailing by Federal Express while the other group received the survey by regular first class mail. The average cost per complete survey for Federal Express was $27.07, and for first class mail $21.63. Although Federal Express was more expensive, the results showed that the Federal Express mailing achieved a higher response rate and that people responded faster to the survey delivered by Federal Express. (JAZ)

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Many different techniques have been used to increase response rates to surveys. In this study, Federal Express overnight delivery service was used to test the effectiveness of express mail in stimulating response to a mail survey of 132 physicians. The sample was randomly split into two groups. One group received the initial mailing via Federal Express while the other group received the initial mailing by regular first class mail. Although Federal Express mail was more expensive than first class mail ($\bar{x}$ = $27.07 vs. $\bar{x}$ = $21.63 per complete survey), findings indicate that the Federal Express mailing achieved a higher response rate ($X^2 = 5.13$, $p < .05$) and that people responded faster to the survey ($t = 3.55$, $p < .01$) than did the first class mail group.

INTRODUCTION

The success of any survey and the usefulness of the results produced can only be assured if the results obtained are truly representative and accurately reflect the relevant characteristics of the people being surveyed. Many problems can interfere with the accuracy of survey results. Such problems include sampling error, reliability and validity problems resulting from poorly constructed questionnaire items, and nonresponse bias.

Nonresponse bias is one of the most significant, widely discussed, and overlooked problems facing users of survey research. It is significant because survey results based on low response rates cannot be assumed to be accurate and representative (20). It is all too commonly overlooked because achieving a high response rate is believed by many people to be either impossible, too expensive, or prohibitively time consuming.

Therefore, many researchers have chosen to ignore the problem. Survey response rates of only 50, 40, 30, or even as low as 20 percent are commonplace. A recent survey conducted by a professor at a midwestern college obtained a response rate of only 33 percent which the professor said was "phenomenal" (19). What is truly phenomenal is that such studies are published, believed, and are not challenged methodologically.

Mail surveys are frequently criticized because of low response rates. However, mail surveys continue to be an important and widely used data collection method. In spite of recent advances in telephone survey methods including technological innovations such as computer assisted telephone interviewing (CATI) and random digit dialing techniques, mail surveys have not been forgotten. In fact, mail survey methods continue to be widely used and may become even more popular if state legislatures begin to enact laws protecting people's "telephone privacy" by limiting access to people by telephone. Such legislation is currently under serious study in many states.

Mail surveys are an important methodological tool to reach people with nonpublished telephone numbers and to survey groups who are difficult to reach by telephone because their lifestyle patterns or their jobs which do not keep them in close proximity to a telephone.

To use mail surveys effectively, the researcher must be prepared to address the danger of nonresponse bias and must do everything possible to obtain cooperation from potential respondents. This means the researcher must be prepared to draw upon a variety of techniques known to stimulate response rates and select those which will be most effective with the population being studied (2).

A great deal of research has been conducted to study the effect of a wide variety of variables in increasing response rates to mail surveys. Some common examples include the use of preletters or other precontacts (4, 9, 13, 17), various incentives (3, 10, 18, 22), diverse types of follow-up reminders (1, 7), personalization (5, 6, 8, 14), and variations in the type of postage used (11, 12, 15, 16, 21) to name only a few.

A relatively recent development in mailing processes is the availability of various "express mail" services. Express mail is a faster and more reliable alternative to conventional first class mail. Of course, it is also more expensive; however, the increased cost must be weighed against the potential benefit of higher response rate, decreased time required to obtain cooperation, and increased initial impact of the mailing on populations who are inundated with conventional mail.

This study was undertaken to test the effectiveness of express mail in stimulating responses to a survey mailed to physicians who are a population from whom cooperation in surveys is notoriously difficult to obtain. Specific hypotheses being tested were:

(1) Mailing surveys via Federal Express will result in higher response rates than mailing via first class mail.

(2) Mailing surveys via Federal Express will produce a given response rate faster than mailing via first class mail.

(3) Mailing surveys via Federal Express will cost no more to achieve a given response rate than mailing via first class mail.

METHOD

To examine the effects of using express mail services to send mail questionnaires to physicians, an experiment was conducted in conjunction with a survey conducted for a large hospital. The questionnaire dealt with physicians' opinions and experiences related to oncology and in-service educational opportunities.

Surveys were mailed to a sample of 132 physicians. These physicians were located throughout the state of Minnesota and eastern Wisconsin.

To test the effects of mailing via express mail, the sample was randomly split into two groups. One group (S=65) received the initial cover letter, questionnaire, and

self-addressed, postage-paid return envelope via Federal Express; the other group (S=67) received the identical materials via first class mail. The survey was mailed to both groups on February 13, 1986, and data collection was completed on March 27, 1986.

The content and timing of each mailing was identical for both groups. The only difference between the two groups was the method of mailing. Both groups received the following mailings:

(1) An original mailing consisting of a cover letter, questionnaire, and self-addressed, stamped return envelope. One group was mailed Federal Express and the other group was mailed via first class mail.

(2) A second mailing consisting of a postcard reminder sent via first class mail to all nonrespondents seven days following the initial mailing.

(3) A third mailing consisting of a reminder message and another copy of the questionnaire sent via Federal Express to all nonrespondents seven days after the second mailing.

Because achieving as high a response rate as possible was important to assure the usefulness of the survey results to the hospital, extensive telephone follow-up was then conducted. Telephone follow-up began 11 days after the third mailing was sent. All physicians who had not responded to any of the mailings were then contacted by telephone to elicit their cooperation. A response rate of 80 percent was ultimately achieved.

Response rates were monitored each day to establish a day-to-day record of response rates for the two study samples. Comparison of response rates using Chi-square tests were conducted to test for differences at strategic points in the study. Results were also examined to compare the amount of time required to obtain given levels of response rates for the two samples, and to compare the cost of using Federal Express versus first class mail.

RESULTS

The results are discussed in three subsections according to the hypotheses outlined in the method. These sections are as follows:

I. Effects of Federal Express mail on response rate.

II. Speed of response using Federal Express mail.

III. Cost of using Federal Express mail.

Within each subsection, results from the Federal Express and first class mail treatments are discussed by looking at the overall results, and, where relevant, at strategic points during the data collection phase. Chi-square and t-tests were used to assess the effects of the Federal Express mailing. Where significant differences ($p < .05$) were found, they are noted.

I. Effects of Federal Express Mail on Response Rate

A total of 105 of the 132 surveys mailed were completed resulting in an overall response rate of 80 percent. Table 1 shows the comparison of response rates of the Federal Express group and the first class mail group at three points in time:

(1) After each group received the initial mailing and a postcard follow-up reminder,

(2) At the conclusion of mail follow-up procedures, and

(3) At the conclusion of the study.

TABLE I

Comparisons of Response Rate Using Federal Express and First Class Mail at Selected Points in Time

Selected Time	Response Rate	
	Federal Express Response Rate %	First Class Mail Response Rate %
After initial mailing and post card follow-up*	54*	34*
Conclusion of mail follow-up procedures	62	49
Conclusion of study	85	75

* $X^2 = 4.34$, $p < .05$

Following the initial mailing and the first follow-up reminder, the Federal Express group response rate was significantly higher ($X^2 = 4.34$, $p < .05$) than the regular first class mail group. At this point in time, 54 percent of the Federal Express mail group had completed and returned the survey form. In comparison, only 34 percent of the regular first class mail group had returned their completed survey.

The response rates of the two groups were not significantly different at the conclusion of mail follow-up procedures or at the conclusion of the study. At the conclusion of mail follow-up, the response rate for the Federal Express group was 62 percent compared with 49 percent for the first class mail group. At the conclusion of the study which included extensive telephone follow-up in addition to mail follow-up reminders, the response rate for the Federal Express group was 85 percent compared with 75 percent for the first class mail group.

II. Speed of Response Using Federal Express Mail

To compare the speed of response using Federal Express and first class mail, the mean number of days it took respondents to return their surveys was calculated at points in time when selected levels of response rate had been achieved. The results of these comparisons are shown in Table 2.

TABLE 2

Comparisons of Speed of Response Using Federal Express and First Class Mail at Selected Levels of Response Rate

	To Achieve a 25% Response Rate	To Achieve a 50% Response Rate *	To Achieve a 75% Response Rate **
Federal Express Mail	$\bar{x}$=6.43 days	$\bar{x}$=7.56 days	$\bar{x}$=13.66 days
First Class Mail	$\bar{x}$=6.41 days	$\bar{x}$=11.82 days	$\bar{x}$=20.00 days

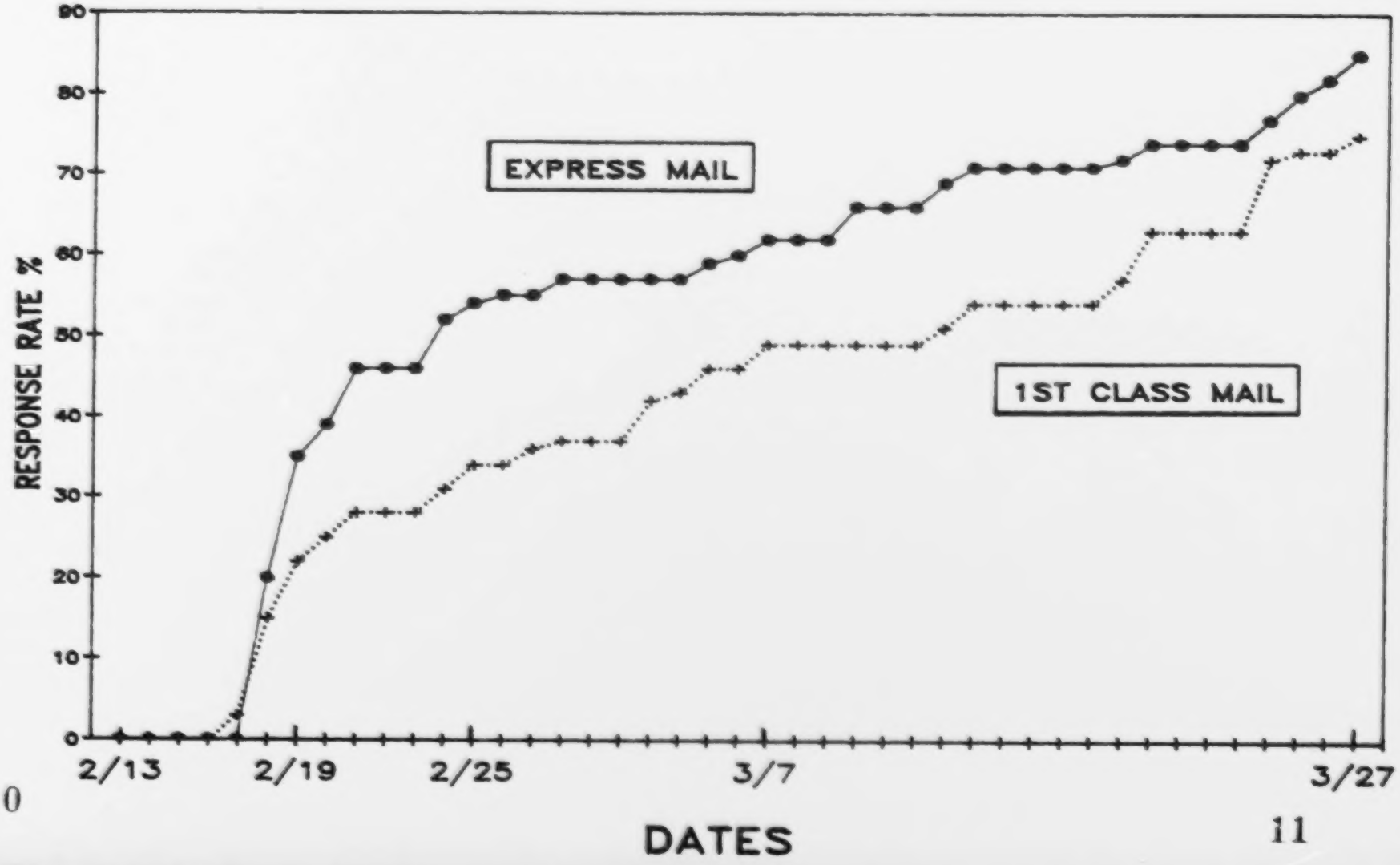
* $t(38)=3.55$, $(p < .01)$
** $t(98)=2.66$, $(p < .01)$

As shown in Table 2, there was no difference in the average speed of response at the 25 percent response rate level. However, significant differences between the groups occured at the 50 and 75 percent levels of response, with Federal Express resulting in faster responses.

Figure 1 shows the daily response rates for both groups. The figure shows that the Federal Express group took fewer days to achieve given levels of response rate than did the first class mail group. For example, the Federal Express group attained a 50 percent response rate in 11 days, while it took 29 days for the first class mail group to achieve a 50 percent response rate.

FIGURE 1

DAILY RESPONSE RATES FOR EXPRESS AND REGULAR MAIL



III. Cost of Using Federal Express Mail

To compare the cost of using Federal Express versus first class mail, total cost for each group was calculated at the conclusion of the study; an average cost per respondent was also calculated. Table 3 shows the average costs per completed survey for each group. The average cost per survey in the Federal Express mail group was significantly higher than the average cost for the first class mail group.

TABLE 3

Comparison of Federal Express and First Class Mail Concerning Cost

Group	Number of Completes	Total Costs	Average Cost Per Survey *
Express Mail	55	$1,489.19	$27.07
First Class Mail	50	$1,081.47	$21.63

* $t(103) = 2.71, (p < .01)$

DISCUSSION

Use of an express mail service can be an effective technique in increasing response rates to mail surveys. Express mail not only increases mail response rates but also achieves responses significantly faster than regular first class mail. The use of Federal Express in this study significantly increased the response rate for a period of seven consecutive days as shown in Table 4 which contains the results of Chi-square tests conducted to compare the daily response rates of the two groups.

TABLE 4

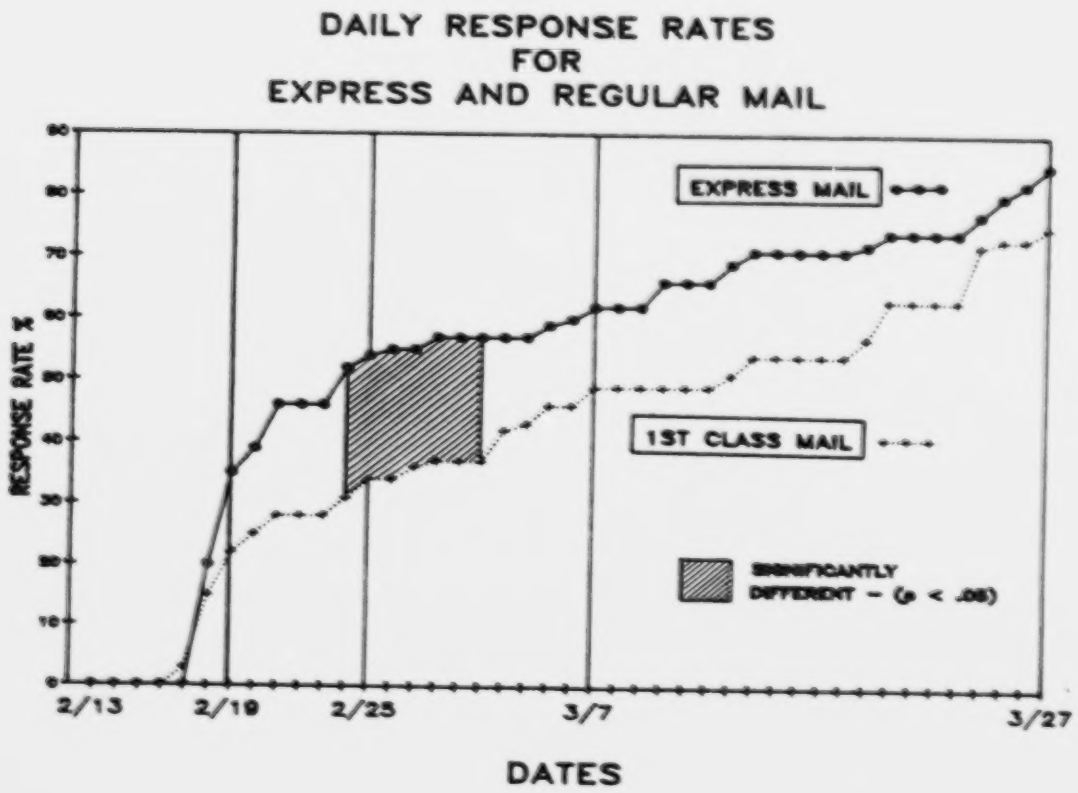
Results of Chi-Square Tests Conducted to Compare Daily Response Rates

Date	x^2	P
2/13/	–	–
2/14	–	–
2/15	–	–
2/16	–	–
2/17	.4775	.4896
2/18	.2905	.5899
2/19	2.1214	.1453
2/20	2.0368	.1535
2/21	3.7463	.0529
2/22	3.7463	.0529
2/23	3.7463	.0529
2/24	5.1345	.0235*
2/25	4.3407	.0372*
2/26	5.0965	.0240*
2/27	4.3346	.0373*
2/28	4.3366	.0373*
3/1	4.3366	.0373*
3/2	4.3366	.0373*
3/3	2.4474	.1177
3/4	1.9398	.1637
3/5	1.5077	.2195
3/6	1.9766	.1597
3/7	1.5476	.2134
3/8	1.5480	.2134
3/9	1.5480	.2134
3/10	3.1969	.0738
3/11	3.1969	.0738
3/12	3.1969	.0738
3/13	3.9534	.0468*
3/14	3.3783	.0661
3/15	3.3783	.0661
3/16	3.3783	.0661
3/17	3.3783	.0661
3/18	3.3783	.0661
3/19	2.8510	.0913
3/20	1.4145	.2343
3/21	1.4145	.2343
3/22	1.4145	.2343
3/23	1.4145	.2343
3/24	.2447	.6209
3/25	.5255	.4683
3/26	.8913	.3451
3/27	1.4538	.2276

* $p < .05$

Federal Express was used at two times during this study. In addition to the initial mailing of one group, Federal Express was used for a follow-up mailing sent to both groups. As shown in Figure 2, there were increases in response approximately six to seven days after both of these express mailings were done. The data suggest that the effect of Federal Express works best if used once at the beginning of the study, rather than as a follow-up technique.

FIGURE 2



2/13 = Initial mailing (letter and questionnaire sent Federal Express to half and first class to half)

2/19 = Second mailing (postcard sent first class)

2/25 = Third mailing (reminder and questionnaire sent Federal Express)

3/7 = Start of telephone follow-up

The fact that extensive telephone follow-up was utilized to achieve a relatively high response rate in this study makes it difficult to assess what effect express mail would have in a study which used only mail techniques. Had telephone follow-up not been used, final response rate differences between groups might have been greater, but the overall study response rate would have decreased and the risk of nonresponse bias would have increased.

Speed of response was increased using Federal Express. Federal Express significantly reduced the average number of days it took respondents to complete the survey at the 50 and 75 percent levels of response. Certainly if speed is a factor when considering mailing techniques, Federal Express can be an effective technique to shorten the timeframe for completing data collection.

As might be expected, the cost of Federal Express is significantly higher than using first class mail. Researchers will want to weigh this factor against the speed and response rate increases associated with using Federal Express. Certainly if data are needed quickly, Federal Express should be considered.

The population in this study is also of interest in that doctors are usually considered a difficult population to survey. By utilizing different techniques for mailing and follow-up, this study shows that difficult populations are reachable and that high response rates can be achieved.

In summary, using Federal Express as a response stimulator in the initial mailing, combined with a mixture of different types of follow-up techniques, can result in faster data collection and higher response rates than first class mail when surveying difficult populations such as physicians. Although cost is significantly higher, the researcher must consider the increased cost in light of other considerations such as time available, need for high response rate, and difficulty of obtaining cooperation from a given population to determine if the increased costs are worthwhile.

Researchers now have a number of new techniques which they can add to their arsenal of tactics to not only generate high response rates but also to achieve those rates quickly. Looking ahead to the future, current legislation is being considered which may restrict the use of the telephone as a method of data collection, and which may necessitate an increased reliance on mail surveys as a method of data collection. Use of new techniques such as express mail in conjunction with mail surveys has been shown to produce favorable results. Hopefully, creative methods of data collection utilizing these new techniques will be continually tested, allowing us to better cope with the problems of information gathering in the future.

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